

We Claim:

- 5
1. A multi-function hub for use in an assist system, comprising:  
a physical interface for providing mechanical support within an assist system;  
programmable logic for implementing program controlled functions; and  
an input/output ("I/O") interface for communication to a plurality of  
computational nodes.
- 10
2. The hub of claim 1 wherein the programmable logic implements input/output  
communication functions.
- 15
3. The hub of claim 1 wherein the programmable logic implements motion control  
algorithms.
- 20
4. The hub of claim 1 wherein the I/O interface provides communication to a  
plurality of sensors.
- 25
5. The hub of claim 1 wherein the I/O interface provides input from an intent  
sensor.
6. The hub of claim 1 wherein the I/O interface provides control outputs to  
actuators.
7. The hub of claim 1 further comprising an electrical interface to provide  
electrical power to a tooling.
8. The hub of claim 1 further comprising an pneumatic interface to provide  
pneumatic power to a tooling.
9. The hub of claim 1 further comprising:

user operable controls accessible from the outside of the hub.

10. The hub of claim 1 further comprising:

an user interface connectable to a an external computer. or PDA

5

11. The hub of claim 1 further comprising:

a network interface in communication with a local area network.

12. The hub of claim 1 further comprising:

10

a network interface in communication with an information network.

13. The hub of claim 1 further comprising:

a network interface in communication with an Internet.

15

14. The hub of claim 1 further comprising:

a load cell for determining the weight of a payload suspended from the multi-  
function hub.

15. The hub of claim 1 further comprising:

20

a strain gauge for determining the weight of a payload suspended from the multi-  
function hub.

16. The hub of claim 1 further comprising:

25

a flexure for determining the weight of a payload suspended from the multi-  
function hub.

17. The hub of claim 1 further comprising:

user programmable switches on the outside of the hub.

18. The hub of claim 1 further comprising:  
a user display.
19. The hub of claim 1 further comprising:  
a personal digital assistant.
20. The hub of claim 1 wherein the physical interface comprises a swivel.
21. The hub of claim 1 further comprising an intent sensor in communication with  
the hub to indicate a user's intent to move the payload.
22. The hub of claim 21 wherein the intent sensor is mechanically fastened to the  
hub.
23. The hub of claim 21 wherein the intent sensor comprises an inline handle.
24. The hub of claim 23 wherein the inline handle comprises a grip.
25. The hub of claim 23 wherein the inline sensor descends from the hub.
26. The hub of claim 21 wherein the intent sensor comprises a slidable collar.
27. The hub of claim 21 wherein the intent sensor comprises a spring return.
28. The hub of claim 21 wherein the intent sensor comprises a hall-effect  
proportional control.
29. The hub of claim 21 wherein the intent sensor comprises user operable  
controls.

30. The hub of claim 21 wherein the user operable controls are programmable.

31. The hub of claim 21 wherein the intent sensor comprises a threaded  
5 mechanical connection.

Add a2 >

09704505-021204